



FAA-E-2055a
August 16, 1978

SUPERSEDING
FAA-E-2055, 11/14/63

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

SPECIFICATION

ILS AND VOR/VORTAC FACILITY
2 1/2 FT. HIGH PLASTIC DOME ANTENNA SHELTER, TYPE 3

1. SCOPE

1.1 Scope.— This specification covers a reinforced plastic antenna shelter assembly, consisting of a dome and base plate.

2. APPLICABLE DOCUMENTS

2.1 Applicable specifications.— The latest issue of the specifications and standards listed in subparagraphs below forms a part of this specification.

2.1.1 Federal specifications

L-P-383 Plastic Material, Polyester Resin, Glass Fiber, Base,
 Low Pressure Laminated

2.1.2 Federal standards

Federal Standard No. 595 Colors

Federal Test Method Standard No. 406 Plastics: Method of Testing

2.1.3 Military specifications

MIL-C-9084	Cloth, Glass, Finished, for Polyester Resin Laminates
MIL-R-7575	Resin, Polyester, Low Pressure Laminating
MIL-M-43248	Mats, Reinforcing, Glass Fiber

2.1.4 American Society for Testing and Materials

ASTM A320	Alloy-Steel Bolting Materials for Low-Temperature Service
ASTM D789	Specification for Nylon Injection Molding and Extrusion Materials

2.1.5 FAA Standards

FAA-STD-013a Quality Control Program Requirements

2.2 Drawings.- The latest issue of the following Federal Aviation Administration drawing forms a part of this specification:

D-5701 - ILS or VOR/VORTAC Facility Antenna Shelter Type 3
2 1/2 Ft. High Plastic Dome
Design Details August 28, 1973

2.2.1 Governing document.- Where this specification differs from the drawing, this specification shall govern.

(Copies of this specification and other applicable FAA specifications, standards and drawings may be obtained from the Contracting Officer in the Federal Aviation Administration Office issuing the invitation for bids or request for proposals. Requests should fully identify material desired, i.e., specification, standard, amendment, and drawing numbers and dates. Requests should cite the invitation for bids, request for proposals, or the contract involved or other use to be made of the requested material.)

(Single copies of applicable federal and military specifications, standards, and drawings may be obtained by ordering through the Naval Publications and Forms Center (NPFC), Philadelphia, which is the Department of Defense Single Stock Print (DOD-SSP) and distribution center for unclassified specifications and standards. Documents may be ordered by writing: Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120; or calling: Area Code: 215, 697-3321, Monday through Friday, from 8 a.m. to 4:30 p.m. (Philadelphia time.)

(Copies of ASTM specifications may be obtained from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

3. REQUIREMENTS

3.1 Materials

3.1.1 Reinforcing.- Reinforcing mat shall meet the requirements as set forth in Military Specification MIL-M-43248B. The contractor shall select the type appropriate to his operation. Reinforcing fabric shall meet the requirements for glass fabric types as set forth in Military Specification MIL-C-9084.

3.1.2 Laminating resin.- The resin used in laminate preparation shall meet the requirements for Grade A Class 1 resin as set forth in Military Specification MIL-R-7575.

3.1.3 Gelcoat.- The gelcoat shall consist of an acrylic (5% minimum) modified polyester resin compounded for spray application. The formulation used shall produce a tightly adhering, non-brittle, pit-free glossy coating on the antenna shelter. Determination of a specific formulation and application techniques to meet these requirements shall be the responsibility of the contractor. A dye stabilizer, American Cyanamid Company's "Cyasorb UV9 or UV5411 Light Absorber", or equal, shall be incorporated into the resin in accordance with the manufacturer's instructions.

3.1.4 Fillers.- Additives and fillers shall comply with Federal Specification L-P-383.

3.1.5 Adhesive.- The adhesive used in fabrication of the unit shall be a structural epoxy type. Formulations containing metallic or carbon powders as bulking agents shall not be used.

3.2 Fabrication

3.2.1 Method.- Fabrication method shall be at the discretion of the contractor, provided the finished laminate meets requirements as specified herein.

3.2.2 Laminate.- The laminate shall have a minimum of 35% glass by weight. Reinforcing shall be either cloth or mat. The maximum permissible quantity of fillers used, based on weight percentage of resin, shall be 5% with cloth reinforcing, and 30% with mat reinforcing.

3.2.3 Surface finish.- Interior surface of the dome shall be equivalent to a bag molded surface. Exterior surface of the dome and both faces of the base plate shall have a glossy surface texture equivalent to that obtained by molding against a polished metal surface. A gelcoat of approximately 15 mils in thickness may be applied to obtain the required surface texture.

3.2.4 Color.- Exterior surface of the dome shall be Aviation Surface Orange (Color No. 12197, Federal Standard No. 595) in color. Other surfaces shall be either Aviation Surface Orange or White. Color shall be achieved by thoroughly mixing pigment into the resin prior to lay up and into the gelcoat prior to application.

3.2.5 Laps.- Lap width shall be not less than 1/2 inch nor greater than 1 1/2 inches and no two laps shall be superimposed upon each other.

3.2.6 Post cure.- In event that plastic components of the antenna shelter are fabricated and cured at room temperatures, they shall receive a post cure at 150° F. for a minimum of 1/2 hour.

3.3 Laminate properties.- Barcol hardness and water absorption test results shall meet the requirements of Table I, Military Specification MIL-R-7575. Dielectric Constant and Loss Tangent test results shall meet the requirements of Table II, Federal Specification L-P-383 for a Type II laminate under immersion conditions. These properties shall be determined as specified herein in Paragraph 4.2. The laminate shall be free of gaps, cracks, holes, blisters, resin pockets, excess surface resin, burning, areas lacking resin, tackiness, delamination, porosity, wrinkling, roughness, and warpage. All such defects may be reworked, except tackiness and serious warpage. Tolerances shown on the drawings shall be maintained.

3.4 Drawings and Instructions.- A packing list, one print of drawing D-5701, one print of any fabrication drawings prepared by the fabricator, and instructions and a list of materials required for field repair of the domes shall be provided with each dome.

4. QUALITY ASSURANCE PROVISIONS

4.1 Quality Control Provisions.- The contractor shall provide and maintain a quality control program in accordance with FAA-STD-013a. All tests and inspections made by the contractor shall be subject to Government inspection. The term "Government Inspection" as used in this specification means that an FAA representative will witness the contractor's testing and inspection, and will carry out such visual and other inspection as deemed necessary to assure compliance with the contract requirements.

4.2 Test methods.- Barcol hardness determinations shall be obtained by direct readings on a Barcol Impressor at three locations selected at random on each component of the plastic antenna shelter assembly. Hardness tests shall be performed on the opposite surface of the laminate from the surface containing the gelcoat. Dielectric constant and loss tangent determinations shall be determined at one megahertz frequency (1 mHz) in accordance with Method 4021 of Federal Test Method Standard No. 406 on three laminate samples cut from the dome. Water absorption tests shall be performed in accordance with Method 7031 of Federal Test Method Standard No. 406. Sample specimens required for water absorption, dielectric constant and loss tangent tests shall be cut from random areas of the antenna shelter assembly as directed by the Government Representative.

4.3. Test procedures.- The first unit of the contract will be submitted for inspection at the contractor's plant. This unit will serve as a model of excellence for all subsequent production units and to determine compliance of physical dimensions with contract drawings. A sufficient number of laminate samples are to be removed from a 15 inch square panel test specimen of uniform thickness ($0.07" + 0.06"$, $- 0.00$) to perform the tests specified herein Paragraph 3.3. It will be the responsibility of the contractor to demonstrate that this unit meets the requirements specified herein by either performing the required laminate tests at his plant in the presence of the Government representative, or by arranging to have the specified test performed in the presence of the Government representative at a local laboratory within a period of three calendar days following the date of first unit inspection. The Government reserves the right to waiver witnessed tests, but in such instance will require certified test data verifying product conformance to the requirements.

5. PREPARATION FOR DELIVERY

5.1 Packaging.- The parts for the handles and bolts, washers, nuts, and other miscellaneous parts, shall be placed in a bag, cloth or plastic, and the bag shall be wired to the inside face of the base plate by the bolt holes in the middle of the base plate. The dome shall be bolted to the base plate, using the six machine bolts, and the washer and nut assemblies. The assembled antenna shelter shall be completely protected by using appropriate wrappings to prevent abrasion or other damage. The antenna shelter shall be packaged in a wooden crate constructed of rigid slats with a maximum of 4 inches between slats. The crates shall be acceptable for rail or truck common carrier shipment. Each crate shall have a packing list, one print of drawing D-5701 and one print of any fabrication drawings prepared by the fabricator, together with instructions and list of materials required for field repair of the domes, enclosed in a waterproof envelope.

The envelope shall be permanently attached to the crate in such a way that the contents can be examined without detaching the envelope from the crate. Each crate shall be prominently marked on one side as follows:

FEDERAL AVIATION ADMINISTRATION
ILS AND VOR/VORTAC FACILITY
2 1/2 FT. HIGH PLASTIC DOME
ANTENNA SHELTER TYPE 3
DRAWING D-5701
MANUFACTURER'S NAME AND ADDRESS

6. NOTES

6.1 Note on information items.- The subparagraphs below are only for the information of the Contracting Officer, intended to assist him in formulating a contract. They are not contract requirements, nor binding on either the Government or the contractor, except to the extent that they may be specified elsewhere in the contract as such. Any reliance placed by the contractor on the information in these subparagraphs is wholly at the contractor's own risk.

6.1.1 Prototype.- The contract Schedule should contain requirements that the first unit of the contract quota will be designated a prototype and is to be submitted for inspection at the contractor's plant; also that such a unit produced by other than production techniques and equipment used in subsequent production will not be considered a prototype. The stipulation should also include the following requirement: that at points directed by the Government Representative, a sufficient number of laminate samples are to be removed from the prototype to perform the tests specified herein Paragraph 3.3.

6.1.2 Quantity production.- The Contract Schedule should contain a stipulation that production beyond the prototype unit/s is not to begin, except at the contractor's risk, until the Contracting Officer has approved the prototype.

6.1.3 Quality control.- The Contract Schedule should contain a stipulation that the fabricator is to keep production units in conformance with the quality of the prototype, and that any change in either material types or material suppliers during the course of the production phase of the contract is to require the preparation and approval of a new prototype, unless otherwise directed by the Contracting Officer.

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